

AMENDMENTS TO THE SPECIFICATION:

Please amend the paragraph bridging pages 19 and 20 as follows:

Fig. 3 is a partially sectional view which explains a shaft coupling system 1' of a second embodiment. Hereinafter, only points which differ from the first embodiment will be described, and the description of the first embodiment is to be referred to as to descriptions of the other points and sectional views taken along the lines B-B and C-C in Fig. 3. These different points are that an intermediate shaft 3' is made up of partial shafts which are divided into two halves of an upper intermediate shaft 31 associated with the inner joint member 22 and a lower intermediate shaft 32 associated with the cross universal joint 4 and that a male spline 311 is formed on the upper intermediate shaft 31 and a female spline adapted to fit on the male spline 311 is formed on the lower intermediate shaft 32.

On page 20, please amend the 1st full paragraph as follows:

The intermediate shaft 3' is allowed to telescope so as to transmit only rotation by virtue of this spline connection. The telescopic characteristic of the intermediate shaft 3' allows for a construction in which the lower end position of the wheel shaft 521 becomes movable when the inclination of the steering column 52 is adjusted with respect to the vehicle main body 91.

On page 20, please amend the 2nd full paragraph as follows:

In place of the spline connection, a shaft mechanism having the same function such as a connecting mechanism made up of a key and a key groove can be adopted which is made up of two partial shafts, which are connected in such a manner as to telescope but not to rotate relatively. In addition, in place of the spline connecting portion of the intermediate shaft 3', a shock absorbing mechanism represented by a rubber coupling or a mechanism for absorbing displacement in collision can be provided at a lower portion of the wheel shaft 521.

On page 22, please amend the 1st full paragraph as follows:

The intermediate shaft system 1'' includes constant velocity ball universal joints 2, 2 [[4]] at upper and lower ends thereof and an intermediate shaft 3'' for connecting these universal joints to each other at an intermediate portion therebetween. The respective constant velocity

ball universal joints 2 are connected, respectively, to the wheel shaft 521 and an input shaft 61 of the vehicle body side steering mechanism 6.

On page 22, please amend the 2nd full paragraph as follows:

Fig. 5 shows explanatory drawings of the intermediate shaft system 1[”] of a third embodiment, in which Fig. 5(A) is a partially sectional view, Fig. 5(B) is a sectional view taken along the line B-B in Fig. 5(A) and Fig. 5(C) is a sectional view taken along the line C-C in Fig. 5(A).

Please amend the paragraph bridging pages 22 and 23 as follows:

The intermediate shaft system 1[”] is constructed as follows. The constant velocity ball universal joints 2, 40 are formed at the ends of the intermediate shaft 3[”], and inner joint members 22, 42, which constitute parts of the constant velocity ball universal joints 2, 40, are formed, respectively. Portions in the vicinity of distal ends of the inner joint members 22, 42 of the constant velocity ball universal joints 2, 40 are formed spherically, and furthermore, ball guide grooves 221, 421 are formed on the spherical surfaces.

On page 23, please amend the 1st full paragraph as follows:

On the other hand, outer joint members 23, 43 have outer joint portions 239, 439 which include spherical recesses, and ball guide grooves 231, 431 are formed in these recesses. These two ball guide grooves 221, 421, 231, 431 extend along the axial direction of the intermediate shaft 3[”] and the outer joint members 23, 43, and torque transmission balls 24, 44 are fitted, respectively, in these grooves in such a manner as to roll therein, whereby the inner joint members 22, 42 and the outer joint members 23, 43 are connected, respectively, to each other with respect to rotation.

On page 24, please amend the 2nd full paragraph as follows:

In order for the fastening bolts 21, 41 to be fastened from the same direction when assembled to the vehicle body, the loose holes 273, 473 are formed in the same side of the intermediate shaft system 1[”] as shown in Fig. 5, thereby making it possible to increase the working efficiency.

Please amend the paragraph bridging pages 24 and 25 as follows:

The intermediate shaft 3[”] of the third embodiment is made up of an upper intermediate shaft 31, which extends integrally downward from the inner joint member 22, and a lower intermediate shaft tube 32[’], which extends integrally upward from the outer joint member 43. A male spline 311 is formed on the upper intermediate shaft 31 and a female spline 321[’] adapted to be fitted on the male spline 311 is formed on the lower intermediate shaft tube 32[’]. The upper intermediate shaft 31 and the lower intermediate shaft tube 32[’] are connected to each other in such a manner as to slide in the axial direction relative to each other so as to transmit only rotational force through the spline connection. The telescoping of the intermediate shaft 3 allows for a construction in which the lower end position of the wheel shaft 521 is allowed to move when the inclination of the steering column 52 is adjusted relative to the vehicle main body 91 and furthermore a relative displacement generated between the vehicle body side steering mechanism 6 and the steering column can be absorbed.

Please amend the paragraph bridging pages 25 and 26 as follows:

Fig. 6 is a sectional view taken along the line A-A in Fig. 5 which shows only the male spline 311 with an involute tooth profile. As shown in Fig. 6, a film 33, which is superior in lubricity and wear resistance, for example, a film 33 of polyamide resin, polyester resin and polyphenylene resin is coated on the surface of the male spline 311, and the surface is finished by scraping. In addition, as the film, a film containing molybdenum disulfide may be used. The film 33 may be coated on the surface of the female spline 321[’] or may be coated on both the male spline 311 and the female spline 321[’]. The intermediate shaft 3 is configured by fitting the male spline 311 and the female spline 321[’], which are constructed as has been described above, in or on each other and applying grease in the fitting portion.

On page 26, please amend the 1st full paragraph as follows:

Fig. 7 is a sectional view taken along the line A-A in Fig. 5 which shows only a male spline 311 313 with an involute tooth profile which is different from the tooth profile shown in Fig. 6. Similar to Fig. 6, also in the case of Fig. 7, a film 33, which is superior in lubricity and wear resistance, for example, a film of polyamide resin is coated on the surface of the male

spline 311, and the surface so coated is finished by scraping. A point which differs from Fig. 6 is that the height (height) of teeth 312, 312 which face each other is formed lower than that of the other teeth.

Please amend the paragraph bridging pages 26 and 27 as follows:

According to this configuration, air can be vented through the portions where the tooth height is reduced while the intermediate shaft 3[”] is in use on the vehicle, so that the male spline 311 and the female spline 321₁ can be kept sliding smoothly. While shortening the height of the two teeth 312, 312 is preferable since the dynamic balance when the intermediate shaft 3[”] is rotating becomes better, the height of only a tooth may be shortened. In addition, the height of a tooth on the female spline 321₁ side may be shortened.

On page 27, please amend the 1st full paragraph as follows:

Fig. 8 is a sectional view taken along the line A-A in Fig. 5 which shows only a male spline 311 313₁ with straight teeth whose profile is different from those shown in Figs. 6, 7. Similar to Figs. 6, 7, in the case of Fig. 8, a film 33, which is superior in lubricity and wear resistance, for example, a film of polyamide resin is coated on the surface of the male spline 311 313₁, and the surface so coated is finished by scraping.

On page 27, please amend the 2nd full paragraph as follows:

Thus, as has been described heretofore, in the intermediate shaft system for the vehicle steering system according to the third embodiment, in order to completely eliminate rattling and striking noise generated when the steering wheel is operated, in the event that it is required that the fitting gap between the male spline 311, 313₁ and the female spline 321₁ approaches zero as close as possible and that the sliding resistance is reduced, the selective fitting of the male spline 311, 313₁ and the female spline 321₁ is to be implemented.

Please amend the paragraph bridging pages 27 and 28 as follows:

In the third embodiment, since the constant velocity universal joints are used at the ends of the intermediate shaft 3[”], being different from the case where the intermediate shaft includes the conventional cross universal joint, the circumferential phases of the male spline 311, 313₁, 313₂ and the female spline 321₁ are limited to a single location in no case. Consequently, since it

becomes extremely easy to find out phases of the male spline 311, 313, 313' and the female spline 321' where the fitting gap becomes minimum by changing the circumferential phases thereof, the time required for the selective fitting is reduced, thereby making it possible to manufacture the intermediate shaft system at low costs. For example, with the male spline having 10 splines as shown in Figs. 6, 7, a single combination of male and female splines can generate 10 possibilities where the selective fitting is implemented well.

Please amend the paragraph bridging pages 28 and 29 as follows:

As with the third embodiment, while an intermediate shaft system 1'"" according to a fourth embodiment includes constant velocity ball universal joints at upper and lower ends thereof and an intermediate shaft 3'"" which connects the joints to each other at an intermediate position therebetween and which is made up of an upper intermediate shaft 31' and a lower intermediate shaft tube 32', the fourth embodiment differs from the third embodiment in a point that a serration connection is used for the connection between the upper intermediate shaft 31' and the lower intermediate shaft tube 32' and that a spring is installed for preventing loosening at a portion where the serration connection is effected.

On page 29, please amend the 1st full paragraph as follows:

In the following description, only points which are different from the third embodiment will be described, and the description of the third embodiment is to be referred to as to descriptions of the other points and sectional views taken along the lines B-B and C-C in Fig. 9. Fig. 9 is an explanatory drawing which explains the intermediate shaft system 1'"" of the fourth embodiment, and Fig. 10 is an enlarged sectional view of a serration fitting portion shown in Fig. 9.

On page 29, please amend the 2nd full paragraph as follows:

As shown in Figs. 9 and 10, an intermediate shaft 3'"" of the fourth embodiment is made up of an upper intermediate shaft 31' which extends integrally downward from an inner joint member 22 and a lower intermediate shaft tube 32' which extends integrally upward from an outer joint member 43, and a male serration 314 is formed on the upper intermediate shaft 31',

whereas a female serration 322 adapted to be fitted on the male serration 314 is formed on the lower intermediate shaft tube 32".

Please amend the paragraph bridging pages 29 and 30 as follows:

The upper intermediate shaft 31" and the lower intermediate shaft tube 32" are connected to each other in such a manner as to slide in the axial direction relative to each other so as to transmit only rotational force through the serration connection. The telescoping of the intermediate shaft 3"" allows for a construction in which the lower end position of the wheel shaft 521 is allowed to move when the inclination of the steering column 52 is adjusted relative to the vehicle main body 91 and furthermore a relative displacement generated between the vehicle body side steering mechanism 6 and the steering column can be absorbed.

On page 30, please amend the 1st full paragraph as follows:

A long groove 315 is formed on the male serration 314 in parallel with the axial direction of the upper intermediate shaft 31", and a wavy leaf spring 316 is inserted in the long groove 315. The leaf spring 316 applies a biasing force in a direction perpendicular to the axis between the male serration 314 and the female serration 322 to thereby eliminate loosening between the male serration 314 and the female serration 322 and prevent the generation of rattling and striking noise.

On page 31, please amend the 1st full paragraph as follows:

In the intermediate shaft system for the vehicle steering system according to the fourth embodiment, in the event that it is required to completely eliminate rattling and striking noise generated when the steering wheel is operated and to reduce the sliding resistance, while the selective fitting of the male serration 314 and the female serration 322 is to be implemented, since the constant velocity universal joints are used at the ends of the intermediate shaft 3"" as in the case with the third embodiment, being different from the case where the intermediate shaft includes the conventional cross universal joint, the circumferential phases of the male serration 314 and the female serration 322 are limited to a single location in no case.

Please amend the paragraph bridging pages 31 and 32 as follows:

Fig. 11 is a partial sectional view which explains an intermediate shaft system 1^{”””} of a fifth embodiment. Hereinafter, only points which are different from the first embodiment will be described, and the description of the third embodiment is to be referred to as to descriptions of the other points and sectional views taken along the lines B-B and C-C in Fig. 11. The fifth embodiment is such that one of the constant velocity ball universal joints in the third embodiment is replaced by a cross universal joint.

On page 32, please amend the 1st full paragraph as follows:

A first yoke arm pair 71_’, which is made up of a pair of arms and which constitutes part of a cross universal joint 7, is formed on a right-hand end of an upper intermediate shaft 31^{””}. A yoke 78_’ of the cross universal joint 7 is inserted into a wheel shaft 521 and is fixed in place by means of a fastening bolt, which is inserted in a loose hole 773. A second yoke arm pair 72, which is made up of a pair of arms, is formed on the yoke 78.

On page 32, please amend the 2nd full paragraph as follows:

A cross member 73 includes four shaft portions which extend in a cruciform fashion, and the respective pairs of opposite shaft portions are borne by the first yoke arm pair 71_’ and the second yoke arm pair 72, respectively. The upper intermediate shaft 31^{””} and the yoke 78 are connected to each other for transmission or rotation by interposing the cross member 73 therebetween.

Please amend the paragraph bridging pages 32 and 33 as follows:

Thus, as has been described heretofore, in the intermediate shaft system for the vehicle steering system of the fifth embodiment, since the cross universal joint, which is inexpensive, is used for one of the universal joints and the constant-velocity ball joint is used for the other universal joint, when performing the selective fitting of a male spline 311_’ and a female spline 321 as in the case with the third embodiment and the second embodiment, being different from the case where the intermediate shaft includes the conventional cross universal joint, the circumferential phases of the male spline 311_’ and the female spline 321 are limited to a single location in no case due to the constant velocity universal joint being used for one of the universal joints of an intermediate shaft 3^{”””}.

Please amend the 1st full paragraph on page 33 as follows:

Consequently, since it becomes extremely easy to find out phases of the male spline 311' and the female spline 321 where the fitting gap becomes minimum by changing the circumferential phases thereof, the time required for the selective fitting is reduced, thereby making it possible to manufacture the intermediate shaft system at low costs.